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SCIFER-CLEFT REGION CORE ELECTRON DISTRIBUTION FUNCTIONS (EXTENDED ABSTRACT)

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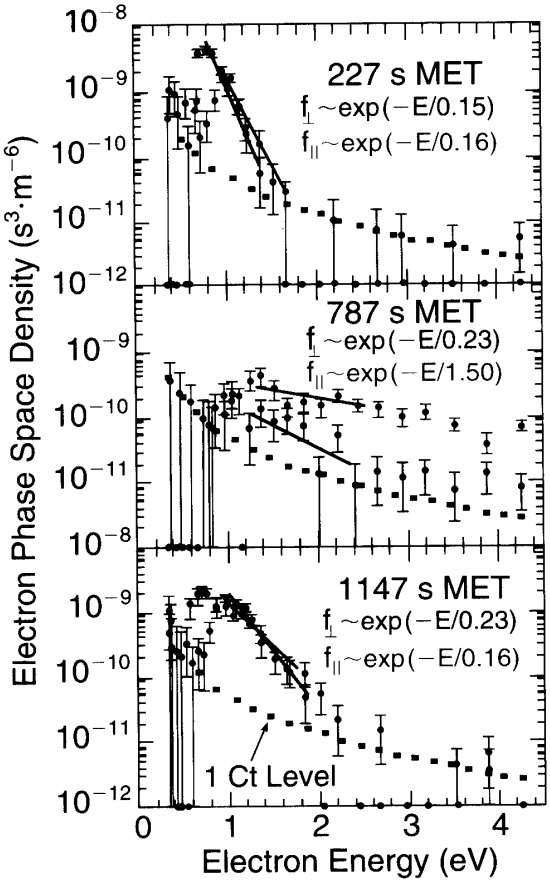
Differential directional ionospheric electron measurements at energies from <1 to 60 eV have been obtained in the Earth's geomagnetic cleft ionosphere on



Electron phase space density at the TECHS aperture is plotted versus energy in six frames. These represent data at transverse and parallel (downgoing) pitch angles, at three times throughout the SCIFER flight, as indicated in the figure. Exponential fits to portions of the tail of the distributions.

NASA's Sounding of the Cleft Region Ion Fountain Energization Region (SCIFER) rocket. We introduce the electron data set, present electron temperature measurements, and show examples of phase space distributions measured near and in the cleft ionosphere. Topside electron temperatures ranged from near 0.15 eV south of the high energy electron trapping boundary to near 1 eV within precipitation regions in the auroral cleft. Field-aligned electron bursts extend down to thermal energies and merge with the core, yielding core heating and anisotropy in the derived electron temperature. One interval is identified where enhanced electron temperature is collocated with a deep density depletion, low frequency electrostatic waves, and transverse ion heating, consistent with operation of the current-driven ion cyclotron instability. On the downleg, in what may be polar cap, the shape of the thermal electron energy distribution was observed to be quite uniform, with temperatures near 0.25 eV.

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